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A method of segmenting Layer 4 packet routing lookups into multiple levels for sequential search in multiple tables provided in a specially organized memory device, such as a content addressable memory (CAM). Using a sequence of limited-width keys, a single CAM (or length-cascaded bank of CAMs) can be tuned to provided faster and more efficient use of limited CAM space. Lookups used to process continuous streams of packets (such as those in the Internet Protocol [IP] format) can be performed with the present invention in either one-packet-at-a-time sequential order or in a pipelined fashion. Packet streams arriving on multiple ports of the switch device can also take advantage of time division multiplexing to employ a single search engine embodying the present invention.